REMARKS

Claims 1-4, 6, 8-10, 19, and 27 have been amended, and claim 17-18, 21, 31-37, and 41-42 have been cancelled. Accordingly, claims 1-16, 19-20, 22-30, and 38-40 remain pending.

The Examiner has objected to the specification with respect to a number of typographical errors, which have been corrected herein.

The drawings have been objected to as failing to comply with 37 C.F.R. 1.84(p)(5) because they do not include a reference symbol T2 for Fig. 2a as mentioned in the specification. A replacement sheet for Fig. 2a has been provided.

The drawings and specification are objected to as failing to comply with 37 C.F.R. 1.84(p)(5) because the reference characters that are not mentioned in the description. Replacement sheets for Figs. 3b, 5a, 7, and 11f, on which the reference symbols, noted by the Examiner, have been removed, are herein provided. However, it is noted that the reference symbol 524 for Fig. 5a appears in the specification on page 42, line 1 and such reference symbol remains on Fig. 5a. It is respectfully submitted that the drawings now comply with 37 C.F.R. 1.84(p)(5).

The Examiner rejected claims 1-32 and 38-42 under 35 U.S.C. §101 as being directed towards non-statutory subject matter. Specifically, the Examiner asserts that the step of "using a scatterometry overlay technique to analyze signals to determine an overlay error" are abstractions without a tangible result. Claim 1 has been amended to recite "using a scatterometry overlay technique to analyze the measured optical signals of the periodic targets and the predefined offsets of the first and second structures of the periodic targets to thereby determine and store an overlay error" to overcome this subject matter rejection. It is respectfully submitted that a stored overlay error value is a tangible result that could be used for any number of practical purposes, such as correction of lithographic process and/or tool. Accordingly, it is submitted that the pending claims comply with 35 U.S.C. §101.

The Examiner has also rejected claim 1 under the judicially created doctrine of obviousness-type double patenting over claims 1, 13, 14, 15, and 21-25 of U.S. Patent Application 10/785,731 (Mieher et al.). A terminal disclaimer is submitted herein.

The Examiner has stated that claims 3-5 and 20-28 would be allowable if rewritten to overcome the rejection under 35 U.S.C. §101 and rewritten in independent form including all the limitations of the base claim and any intervening claims.

The Examiner rejected claims 1 and 38-41 under 35 U.S.C. §102(e) as being anticipated by Yang et al. (U.S. Patent 6,982,793). The Examiner has also rejected claims 2, 6, 10, and 12-17 under 35 U.S.C. §103(a) as being unpatentable over Yang et al. Claims 7 and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yang et al. in view of Shiraishi et al. (U.S. Patent No. 5,966,201). Claims 7, 9, 19, and 29-31 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yang et al. in view of Johnson et al. (U.S. Patent No. 5,388,909). Claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Yang et al. in view of Hignette et al. (U.S. Patent No. 5,191,393). Claims 18 and 42 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yang et al. in view of Niu et al. (U.S. Patent No. 6,699,624). Claim 32 is rejected under 35 U.S.C. §103(a) as being unpatentable over Yang et al. in view of Johnson et al. further in view of Niu et al. The Examiners rejections are traversed as follows.

Claim 1 is directed towards a method of determining an overlay error between at least two layers in a multiple layer sample. Claim 1 also recites "using an optical system to measure a plurality of measured optical signals from a plurality of periodic targets on the sample, wherein the targets each have a first structure in a first layer and a second structure in a second layer, wherein there are predefined offsets between the first and second structures." Claim 1 further recites "using a scatterometry overlay technique to analyze the measured optical signals of the periodic targets and the predefined offsets of the first and second structures of the periodic targets to thereby determine and store an overlay error between the first and second structures of the periodic targets, wherein the scatterometry overlay technique is a phase based technique that includes representing each of the measured optical signals as a periodic function having a plurality of measured, known parameters, which are obtained from the each measured optical signal, and an unknown overlay error parameter and analyzing the set of periodic functions to solve for the unknown overlay error parameter to thereby determine the overlay error."

This phase based scatterometry technique is preferred in some circumstances, depending on variables that include scatterometry overlay target pitch, scatterometry overlay target design, scatterometry overlay (SCOL) target materials, the measured scatterometry signal, and the like. See Page 30, first paragraph of the current specification, for example.

Although the primary reference Yang appears to be directed towards determining overlay by analyzing optical signals measured from targets having offsets, it is respectfully submitted that the teachings of Yang are based on a <u>linear</u> scatterometry technique. See, for example, Equations 5 in Col. 5 and Equation 8 in Col. 16. That is, Yang fails to teach or suggest determining overlay error using a phase based scatterometry technique "that includes representing each of the measured optical signals as a periodic function having a plurality of measured, known parameters, which are obtained from the each measured optical signal, and an

unknown overlay error parameter and analyzing the set of periodic functions to solve for the unknown overlay error parameter to thereby determine the overlay error." The secondary references also fail to teach or suggest such limitation. For example, the secondary reference Niu et al. is cited for teaching use of an ellipsometer for scatterometry and using a phase in ellipsometry with respect to rejecting original claim 18, which recited a phase scatterometry technique (e.g., citing Col. 4, lines 65-67 and Fig. 12b and 26a). However, it is respectfully submitted that Niu et al. fails to teach representing the measured optical signals as periodic functions having known and unknown parameters, including an unknown overlay error, and then analyzing such periodic functions to solve for the unknown overlay error, in the manner claimed. Thus, it is respectfully submitted that claim 1 is patentable over the cited art.

The Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-16, 19-20, 22-30, and 38-40 each depend directly or indirectly from independent claim 1, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claim 1. Further, the dependent claims require additional elements that when considered in context of the claimed inventions further patentably distinguish the invention from the cited art.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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